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AUTHOR Allen, David F.
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ABSTRACT

This study tested Pascarella's reconceptualization of Tinto's model of the persistence/withdrawal process for use in a non-residential institution. Subjects (n=372) were college freshmen who had attended freshmen orientation and had completed an opinionnaire both during orientation and at the end of their first year in a medium-sized, urban commuter institution. Path analysis and estimates of direct and indirect causal effects were used to test the predictive validity of the model. Results tended to confirm the importance of applying causal models cautiously even within the same types of institutions. Results further suggest that there is considerable between-institution variance within the broad category of commuter colleges. The influence of key concepts such as social integration and institutional commitment were found to vary significantly from the reconceptualized version of Tinto's model. The degree of fit between the individual student and the institutional environment was largely predicated upon the magnitude of relationship between academic integration and institutional commitment. Other things being equal, the greater the individual's level of academic integration, the greater his or her subsequent commitment to the institution. The combination of academic integration and subsequent commitment were seen as having a positive influence on persistence. (Author/ABL)

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# ATTRITION AT A COMMUTER INSTITUTION: A PATH ANALYTIC VALIDATION OF TINTO'S THEORETICAL MODEL OF COLLEGE WITHDRAWAL

Submitted by

David F. Allen
Special Assistant to the Vice Chancellor for Student Affairs
University of North Carolina at Wilmington
601 S. College Road
Wilmington, NC 28403-3291

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Abstract

This study tests Pascarella et al's (1983) reconceptualization of Tinto's (1975) model for use in a non-residential institution. Their revised model was estimated on a sample of 372 freshmen who had attended freshmen orientation and had completed an opinionnaire both during orientation and at the end of their first year in a medium-sized, urban commuter institution. Path analysis and estimates of direct and indirect causal effects were used to test the predictive validity of the model. Results tend to confirm the importance of applying causal models cautiously even within the same types of institutions. This study suggests that there is considerable between-institution variance within the broad category of commuter colleges. The influence of key concepts such as social integration and institutional commitment were found to vary significantly from the reconceptualized version of Tinto's model. In this study, the degree of fit between the individual student and the institutional environment was largely predicated upon the magnitude of relationship between academic integration and institutional commitment. Other things being equal, the greater the individual's level of academic integration, the greater his or her subsequent commitment to the institution. The combination of academic integration and subsequent commitment are seen as having a positive influence on persistence.

## Attrition at a Commuter Institution: A Path Analytic Validation of Tinto's Theoretical Model of College Withdrawal

While the scholarly literature concerning retention research is voluminous (e.g., Pantages and Creedon, 1978) it has been accused of being a mile wide and only a few inches deep (Marchese, 1983). Tinto's (1975) development of an explanatory longitudinal model of the persistance/withdrawal process offers parsimony to this field of study. As student persistence in post-secondary institutions becomes a major barometer of educational impact or excellence (Mortimer et al., 1984) the need for conceptually potent and pragmatically effective models increases.

Basing his model largely on the degree of fit between each student and the institutional environment, Tinto's (1975) model is buttressed upon the concept of person-environment fit. In brief, the background traits (i.e., family background, individual attributes, and precollege schooling) that a student brings to campus coupled with initial commitments to both the goals of graduating from college and the institution attended influence not only academic performance but determine how integrated into the institution's social and academic systems the student becomes. This integration affects his or her subsequent commitment to the institution and commitment to the goal of college graduation. This interplay between commitment and integration are seen as ultimately influencing persistence. Academic and social integration as Tinto's two key concepts and the predictive validity of

his model are well established in the research in the last decade (e.g., Aitken, 1982; Bean, 1983; Pascarella and Chapman, 1983; Pascarella and Terenzini, 1983; and Terenzini et al, 1983). A conceptual schema of Tinto's (1975) model is shown in Figure 1.

Unfortunately, Tinto's model is based on research conducted at mostly four-year largely residential institutions. Much of the existing research on persistence estimating Tinto's model has essentially ignored the commuter university setting. Pascarella, Duby, and Iverson (1983) reconceptualized Tinto's model for use in non-residential institutions and concluded that, while commuter institutions as a group may differ substantially from residential institutions in the educational, cultural, and social experiences they provide students, within the broad category of commuter colleges, there is likely to be considerable between-institution variance. An important contribution to our understanding of the institutional determinants of student persistence/withdrawal behavior would be to investigate the patterns of influence suggested by the revised model.

This paper seeks to address the weakness in the literature of restricting the estimation of Tinto's (1975) model to residential campuses by employing Pascarella et al's (1983) suggested reconceptualization of Tinto's model to explain the short term persistence/withdrawal behavior of a nonresidential sample. Specifically, the study sought to determine if the pattern of influences hypothesized by Pascarella et al's revised model was generalizable to a commuter university setting. The revised model used in the current study

was estimated on a sample of 346 students from all first-time, full-time freshmen of a medium, urban, Master's granting, commuter university in the southeast who participated in the Cooperative Institutional Research Program (CIRP) in the summer of 1984.

It is the contention of Pascarella et al (1983) that the reconceptualized or revised model displayed in Figure 2 will be more appropriate in less traditional post-secondary institutions where students reside off campus. Several modifications to Tinto's original model were suggested by Pascarella et al. As shown in the figure, the revised version expands Tinto's Model by introducing Bean's (1981) concept of "intention to leave or stay" as an important mediating influence on persistence/withdrawal behavior. The influence of subsequent institutional commitment on persistence is expected to be mediated by the intent to persist. Also assumed in the revised model is the notion that characteristics which students bring to college will directly impact their persistence behavior. Thus, unlike Tinto's (1975) original model, precollege characteristics can be expected to have strong direct effects on persistence. According to the reconceptualized model, entering institutional commitment is expected to directly influence academic integration which in turn directly influences subsequent institutional commitment. And finally, Pascarella et al (1983) found that social integration is expected to have either nonsignificant or strongly negative affects based on the notion that commuter institutions typically provide fewer opportunities for social involvement and integration than residential institutions, and that this may lead to a

more complex relationship between social integration and institutional persistence than originally hypothesized by Tinto.

## Method

The data were drawn from the 1984 CIRP Survey administered during freshmen orientation to an overall sample of 878 students. The CIRP survey collected a broad array of student background information, aspirations and expectations of college. During the late spring of 1985, the same students completed a follow-up instrument that collected information about the reality of their freshmen year experience. The follow-up survey was administered through English classes and was largely adapted from an instrument employed by Pascarella and Terenzini (1980). Usable responses were received from 372 students (42%). The 372 freshmen were representative of the institutions freshmen population with respect to sex, race, and academic aptitude (SAT scores).

In the fall of 1985, student records indicated that 278 of the 372 freshmen had reenrolled for their second year and that 68 had voluntarily withdrawn. A total of 26 students had been required to withdraw for academic reasons. Based on the work of Cope and Hannah (1975) that suggest voluntary withdrawals are significantly different from forced withdrawals, all forced withdrawals were excluded from the analysis. Voluntary freshmen to sophomore withdrawals represented 18.3%, and this rate is consistent with previous known voluntary withdrawal rates for this university.

Variables

Pascarella et al's reconceptualization schema of Tinto's (1975) model retains the original five constructs or variable sets in a causal sequence and adds a sixth variable, intention:

1. Background characteristics (i.e., family background, individual attributes, and precollege schooling);
2. Initial precollege commitments to the college and the goal of college graduation;
3. Academic and social integration;
4. Subsequent goal and institutional commitment;
5. Intention to persist or withdraw;
6. Persistence/withdrawal behavior

Operational definitions of each construct follows:

Background Characteristics -

Family background - one variable was used to operationalize this characteristic. It was termed Socioeconomic Status (SES) which was the sum of the parents' combined level of education (six categories from "grammer school or less" to "post-graduate degree"), combined parental income (12 categories from "less than $4,000" to "$40,000 or more"), and amount of financial aid awarded from all sources during the first year (six categories coded in reverse: 6 = "no aid" to 1 = "greater than $2,000").

Individual attributes - four attributes were operationalized according to sex (1 = male; 2 = female); race (1 = minority; 2 = nonminority/caucasian); expected major (1 = preprofessional; 2 = liberal

arts [e.g. English, philosophy, etc.]); and academic aptitude SAT composite scores.

Precollege schooling - two variables were used to measure precollege schooling: secondary school grades ( 1 = D to 8 = A or A+) and secondary school social activities engaged in frequently (14 activities; e.g., won a varsity letter for sports, elected president of a student organization, participated in a speech contest, etc.)

Initial Commitments -

Goal Commitment I - this was the sum of two items: (1) highest expected academic degree (Coded: 1 = Bachelor's or less; 2 = Master's or more); (2) preenrollment expectation that a student would get a Bachelor's degree (1= no chance, to 4 = very good chance).

Institutional Commitment I - this was the sum of three items: (1) choice of current college (1 = less than third choice, to 4 = first choice); preenrollment expectation that the student would transfer to another institution (1 = very good chance, to 4 = no chance); preenrollment expectation that the student would be satisfied with the subject university (1 = no chance, to 4 = very good chance).

Academic Integration -

Tinto (1975) claims this is determined primarily by the student's academic performance and intellectual development. It was the sum of three items: (1) average undergraduate grades through the end of the first year (Coded 1 = less than 1.5 GPA, to 5 = 3.0 GPA or better); and two items measuring a student's perceived level of intellectual development: (2) "My academic experience has had a positive influence

on my intellectual growth and interest and ideas," and (3) "I am satisfied with the extent of my intellectual development since enrolling at this college" (Coded 1 = strongly disagree, to 5 = strongly agree).

Social Integration -

According to the Tinto model, social integration is primarily a function of student interactions with faculty and peers. It was the sum of three items taken from the follow-up survey and measured using a Likert-response scale: (1) "Since coming to this university, I have developed close personal relationships with other students; (2) "My nonclassroom interactions with faculty have had a positive influence on my personal growth, values and attitudes; and (3) "This academic year I have taken membership in at least one campus organization" (Recoded: 1 = no membership, 2 = membership in one or more).

Institutional Commitment/Satisfaction II -

As in Tinto's model, the present study operationally defines subsequent commitment in terms of overall satisfaction with college. This variable is operationally defined as the student's response to two items measured on the follow-up survey using a Likert-response scale: "If given the chance to transfer, I would" (Coded: 1 = strongly agree, to 5 = strongly disagree); and "I am confident that I made the right decision in choosing to attend this university" (Coded: 1 = strongly disagree, to 5 = strongly agree).

Goal Commitment II -

This was the sum of two items: highest expected academic degree (1 = Bachelor's degree or below, 2 = Master's degree or above); and "It is important for me to graduate from college" (5 = strongly agree, to 1 = strongly disagree).

Intention -

Intention was a single item variable: "I plan to reenroll this fall" (3 = yes, 2 = not sure, 1 = no).

Freshmen year voluntary persistence/withdrawal behavior (referred to as persistence) was the only dependent measure taken and was obtained from official university records in the fall of 1985 (dummy coded 2 = persisters and 1 = voluntary withdrawals). While it is acknowledged that there may be no ideal solution to the problems involved in defining persistence in post-secondary education, and that it may make sense to explore withdrawal during college years beyond the first year at the institution being studied as well as the one in which the study attempts to replicate (i.e., Pascarella et al 1983), the end of the freshmen year is a time of particularly high withdrawal and/or transfer to other institutions. Given this evidence coupled with that from Pantages and Crendon (1978) which suggest that voluntary withdrawal is heaviest at the end of the freshmen year, analyses based on a freshmen sample was determined to be most appropriate to estimate the revised model for persistence/withdrawal behavior.

Combination items that were scaled on a different metric (i.e., SES, goal commitment I, goal commitment II, institutional commitment I, academic

integration and social integration) were constructed by initially standardizing each constituent item or subscale and then summing across standardized items (Armour, 1974).

Data Analysis

Identical analyses to the Pascarella et al (1983) study were replicated in this research. That is, hierarchical regression analysis was used to determine the incremental increase and explained variance in persistence/withdrawal behavior ($R^2$ increase) associated with the different variable sets entered in an a priori hierarchical manner into the model. Then, discriminate analysis was used to determine the power of the variables in the model to correctly classify individual persisters and withdrawals (prior probability set at .50). To test the validity of the revised causal model, path analysis was used to produce a "reduced" path model (Heise, 1975). This was done by generating two path models. Based on the first path, nonsignificant paths were eliminated, and a second round of regressions was conducted using only those variables with initially significant path coefficients. Finally, an additional analyses was conducted to determine the significance of all direct and indirect causal effects. This required the solution of eight structural equations in which each of the eight endogenous variables was regressed on all seven exogenous variables and all causally antecedent endogenous variables in the model. Exogenous variables are those determined by influences outside the model (i.e., background characteristics). Those variables determined within the model are considered endogenous (i.e., initial and subsequent commitments, academic and social integration, and the persistence measure). Structural

equations yield standardized regression (beta) weights which can be interpreted as "direct causal effects" (Kerlinger and Pedhazurg, 1975) controlling for all other variables in the equation. Wolfle (1985) determined that the significance of indirect causal effects may be estimated by summing the products of causal effects through intervening variables.

Results

Table 1 is a presentation of the means, standard deviations, and intercorrelations for all the variables. As Table 1 shows, most of the group tended to be white persisters with about as many men as women. Table 2 summarizes the results of the hierarchical regression analysis. The model without intention (Steps 1-4) explained 10% of the variance in voluntary persistence/withdrawal behavior. This is just less than half of the variance reported by Pascarella et al. However, it is consistent with other $R^2$ reported by Pascarella and Chapman (1983) in their test of Tinto's (1975) model in a commuter institution. The intention variable increased $R^2$ to 30.5%. Two of the variable sets resulted in a statistically significant increase in $R^2$: academic and social integration (2.8%); and intention (20.8%).

That background characteristics as a set were associated with the second largest (intention was largest) increase in $R^2$ (6.5%) compared with the $R^2$ increase associated with academic and social integration (2.8%) is of particular interest. This suggests that the background characteristics which commuter students bring to college are at least as important in their dropout decisions as their actual experiences of college once enrolled.

The importance of background characteristics, however, is mitigated when results of the classification analysis are examined as shown in Table 2. While the background set correctly identified 59.1% of the subsequent persisters and withdrawals, most of the improvement in correct classification was due the intention variable. Its addition yielded and increase beyond chance in correct classification of 17.6% over that due to all previous sets and almost twice as much increase over chance as attributable to student entering characteristics (9.1%).

Equation 2 of Table 3 shows that three variables had significant positive direct effects on persistence when all variables were included in the model. Thus, having the intention to persist, being academically integrated, and desiring to pursue a non-applied major all positively influence persistence. This pattern held even when the intention variable was removed. Expected major was the only student background characteristic that had a significant direct effect on persistence. Structural Equation 15 in Table 4 shows that both of the other variables having a positive influence on persistence were in turn directly influenced by antecedent variables. That is, intention to persist was directly influenced by Institutional Commitment II. Academic integration was directly influenced by initial goal commitment, ethnicity, and secondary school grades. That is, students who were initially committed to the goal of achieving the Bachelor's degree were Caucasian and had good high school grades. They tended to be those most likely to do well academically during their first year. Moreover, initial goal commitment was directly influenced by academic aptitude (SAT score).

From the structual equations derived for the regression of persistence on variables in the model, two reduced path models without intention and with it, respectively, indicate several interesting trends as depicted in Figures 3 and 4. These trends are consistent between both path models derived in the study. First, only one background characteristic had significant direct effects on persistence/withdrawal behavior. Controlling for all other variables in the model, non-applied majors were significantly more likely to persist than applied majors.

A second important trend was in the role of race on institutional commitment. From both models, it is clear that non-white students have an initially higher institutional commitment than whites, but fail to persist in this commitment after one year.

A third interesting trend is in the area of academic and social integration. Contrary to expectations, both academic and social integration do not have direct effects on persistence. Only academic integration had direct effects. The corresponding influence on social integration, however, was nonexistent; a finding inconsistent with that of Pascarella et al's reconceptualized model. They found social integration to have a negative impact on persistence in their commuter study.

The role of goal and institutional commitment variables present a fourth interesting trend which conflicts with Pascarella et al's model. The current model is consistent with Tinto's expectation that entering goal commitment influences academic integration which in turn influences subsequent goal commitment. According to Pascarella et al, initial goal commitment failed to directly influence academic integration.

According to Tinto's model, subsequent goal commitment should then have a direct influence on persistence. This materialized neither in the present study nor in Pascarella et al's version.

In addition, it was expected that initial Institutional Commitment I would influence social integration. This also failed to occur in either reconceptualization. Subsequent institutional commitment was expected to directly influence persistence. In Pascarella et al's model, this did not occur in either of their reduced path models. In the present study, however, subsequent institutional commitment directly influenced persistence only when the intention variable was removed.

A fifth trend was that in Pascarella et al's study initial institutional commitment had a direct influence on academic integration rather than on social integration, and academic integration rather than social integration had a direct effect on subsequent institutional commitment. They concluded that in nonresidential institutions, commitment to the institution after one year is defined largely by successful and personally satisfying interactions with the academic rather than the social systems of the institution. In their model, neither institution nor goal commitment measured at the end of the freshmen year had a significant direct influence on persistence/withdrawal behavior.

In the current study, initial institutional commitment failed to impact either academic integration or social integration. Howeyer, both academic and social integration did directly influence subsequent institutional commitment. Thus, it would appear that even in nonresidential institutions, commitment to the institution after one year is defined

largely by a successful and personally satisfying integration into both the academic and social systems of the university--regardless of one's initial commitment to the institution.

Because several background variables and initial commitment variables significantly influenced variables that in turn directly affected persistence, it is important to also examine indirect effects. Table 5 presents, controlling for intention, the indirect effects of all variables in the model on persistence. Estimating indirect effects as the sum of the products of causal models through intervening variables, Wolfle (1985), Sobel (1982), and Wolfle and Ethington (1984) developed a computer algorithm (Project Gemini) for the calculation of standard errors for indirect effects. With this information, significance tests (t ratios) for indirect effects are then computed for each predictor variable. Table 5 not only shows the metric indirect effects of each variable on persistence with and without the intention variable, but also indicates their statistical significance.

As Equation 1 in Table 5 shows, a total of two variables had significant indirect effects on persistence when the intention variable was omitted from the equation, whereas only one variable had a significant indirect effect on persistence when intention was included. Academic and social integration had significant positive indirect effects on persistence without the influence of the intention variable. Being academically and socially integrated had a positive indirect influence on persistence largely through Institutional Commitment II. As expected, inclusion of the intention variable served to mediate the significant positive indirect

effects of Institutional Commitment II on persistence.

## Conclusions and Discussion

Results of this study of a single-institution, single-year sample have implications both for our understanding of our institutional determinants of student persistence/withdrawal behavior and for applying Pascarella et al's (1983) reconceptualization of Tinto's model in nonresidential institutions. Testing of their model gives credence to their suspicion that within the broad category of commuter colleges, there is likely to be considerable between-institution variance. Certain parts of their revised model function effectively in this study, while others do not. For example, asking students at the end of their first year whether they plan to continue at the institution had the strongest direct effect on freshmen year persistence/withdrawal decisions, and explained the largest amount of variance in persistence when added to the original model. This is consistent with patterns of influence suggested by Pascarella et al's study. However, the present study resembles more of the residential type institution that Tinto studied than the commuter institution in Pascarella et al's study when goal commitment is considered. That is, according to Tinto, it is the interplay between the individual's commitment to the goal of college completion and his commitment to the institution that determines whether or not the individual decides to drop out. Tinto expected high initial goal commitment to positively affect academic integration. In Pascarella et al's study, there was no significant direct effect of initial goal commitment on either academic integration or social integration. In the present study, goal commitment had a positive direct effect on both

academic and social integration with and without inclusion of the intention variable.

That both models used essentially identical variables and explained almost the same amount of variance in persistence is significant. A 15-variable model as used in this study accounted for 30.5% of the variance of persistence. Pascarella et al's reconceptualized model accounted for 28.2% of the variance in the same behavior. Adding the intent variable to the Pascarella et al model increased explained variance from 19% to 28.2%. This increase was nearly a 50% improvement in explained variance. In the present study, intent to persist increased the explained variance from 10% to 30.5%. This 20.5% increase doubled the improvement in explained variance. While it is clear in both studies that intentions are a reliable indicator of decisions affecting persistence, as Bean (1981) has indicated, asking about intentions after one year or more may be too late in that there would be no time for implementation of intervention strategies.

While the overall variance percentages explained in the models are important, a comparison of the patterns of direct and indirect effects of variables in the models may be of more significance. It is Tinto's (1975) contention based on his theoretical synthesis of retention research that "it is the individual's integration into the academic and social systems of the college that most directly relates to his continuance in that college" (p. 96). This comment fails to reflect the importance of background traits affecting drop out behavior in nonresidential institutions. In both the current study and in Pascarella et al's, background characteristics were found to significantly affect persistence. One background characteristic

in this study directly influenced persistence. Students who had intended to major in liberal arts were more likely to persist. However, based on other findings in this study, the direct positive influence of Tinto's central concept of academic integration is quite consistent with theoretical expectations of the model and with the results of Pascarella et al's commuter institution study. What is peculiar in the present study, yet consistent with Pascarella et al's study, is the role of social integration. The hypothesized pattern of influence is that given a reciprocal, functional relationship between social and academic integration, students with higher and more personally satisfying levels of social interaction with faculty and other students would tend to persist. Pascarella et al (1983) found a negative influence of social integration on persistence and suggested that this phenomena has to do with the characteristics of students who have high levels of social integration in what these students come to expect of their institution. They concluded that "social integration may be somewhat of a liability in that it precipitates rising expectations for social interaction which the nontraditional environment may not be able to adequately satisfy" (p. 97). In the present study, social integration had a nonsignificant influence on persistence, even when controlling for the intention variable. However, without the intention variable, social integration had a significant positive indirect influence on persistence as mediated by subsequent institutional commitments. Thus, with all variables in the model, one cannot predict persistence based on the level of social integration. This finding, therefore, strengthens the importance of the

role played by academic integration in commuter institutions and underscores the complexity of the relationship between social integration and institutional continuance.

A final issue in replicating Pascarella et al's reconceptualized model in a commuter institution concerns the role of commitment variables. Tinto expected that commitment to the goal of attaining a degree would be directly related to persistence as would educational expectations to attend one institution rather than another. It is this longitudinal process of interactions between individual commitments and experiences within the academic and social systems of the college whereby students continually modify their goal and institutional commitments in ways which lead them to persist or drop out. In the current study, institutional commitment has both significant positive direct and indirect effects, depending on the inclusion of the intention variable.

Unlike the current study, however, when Pascarella et al removed the intention variable, institutional commitment failed to have a significant effect on persistence. This underscores the importance of institutional commitment at the university under investigation in this study.

Moreover, while institutional commitment was mostly a product of academic and social integration, it is worth noting that race also had a significant influence on institutional commitment. As mentioned, nonwhite students had initially higher levels of institutional commitment. Yet after one year, this trend reversed itself. One might suspect that this switch was related to the amount of social or academic integration into the system during the first year. This was not evidenced since initial

institutional commitment had no direct effect on either academic or social integration. Part of this may be because there were only 20 nonwhites in the sample. Lack of power due to small sample size or sampling error may account for many of the nonsignificant findings in this study.

In terms of goal commitment, not unlike Pascarella et al's reduced path models, goal commitment measured at the end of the freshmen year failed to have a positive influence on persistence. However, with exclusion of the intention variable in this study, academic integration had a positive significant indirect effect on persistence which occurred mostly through its influence on goal commitment. Thus, it can be expected that the more academically integrated student will also be highly committed to the goal of graduating from college and expect to at least earn the Master's degree.

From this study it seems evident that persistence in some commuter institutions may be predicated mainly upon three factors: (1) the student's intention to persist; (2) the individual's attaining sufficient levels of integration in the institution's academic system as measured by the student's academic performance and assessment of their own intellectual development; and (3) their commitment to the institution in terms of overall satisfaction with the college after a period of time as measured by their confidence in choosing to attend the university and by their not desiring to transfer.

This study has been an attempt to replicate that of Pascarella et al's in a commuter institutional setting. It is clear that all commuter institutions are not the same and that it may indeed by necessary to add variables to the model as well as to rethink the patterns of influence among existing variables. Mapping the terrain of influences on persistence as suggested by this study should encourage commuter institutions to place special emphasis on investigating the complex relationships among social involvement, institutional commitment and persistence/withdrawal behavior. That is, do increased opportunities for social involvement and integration lead to higher levels of institutional commitment and therefore enhance persistence? And, does increased faculty involvement and creative programming strategies targeted toward the special interest of students positively impact persistence? Answering these questions and applying the data to explanatory, longitudinal models of the persistence/withdrawal process would significantly contribute to our understanding of the degree of fit between the individual student and the institutional environment.

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## MODEL OF COLLEGE WITHDRAWAL

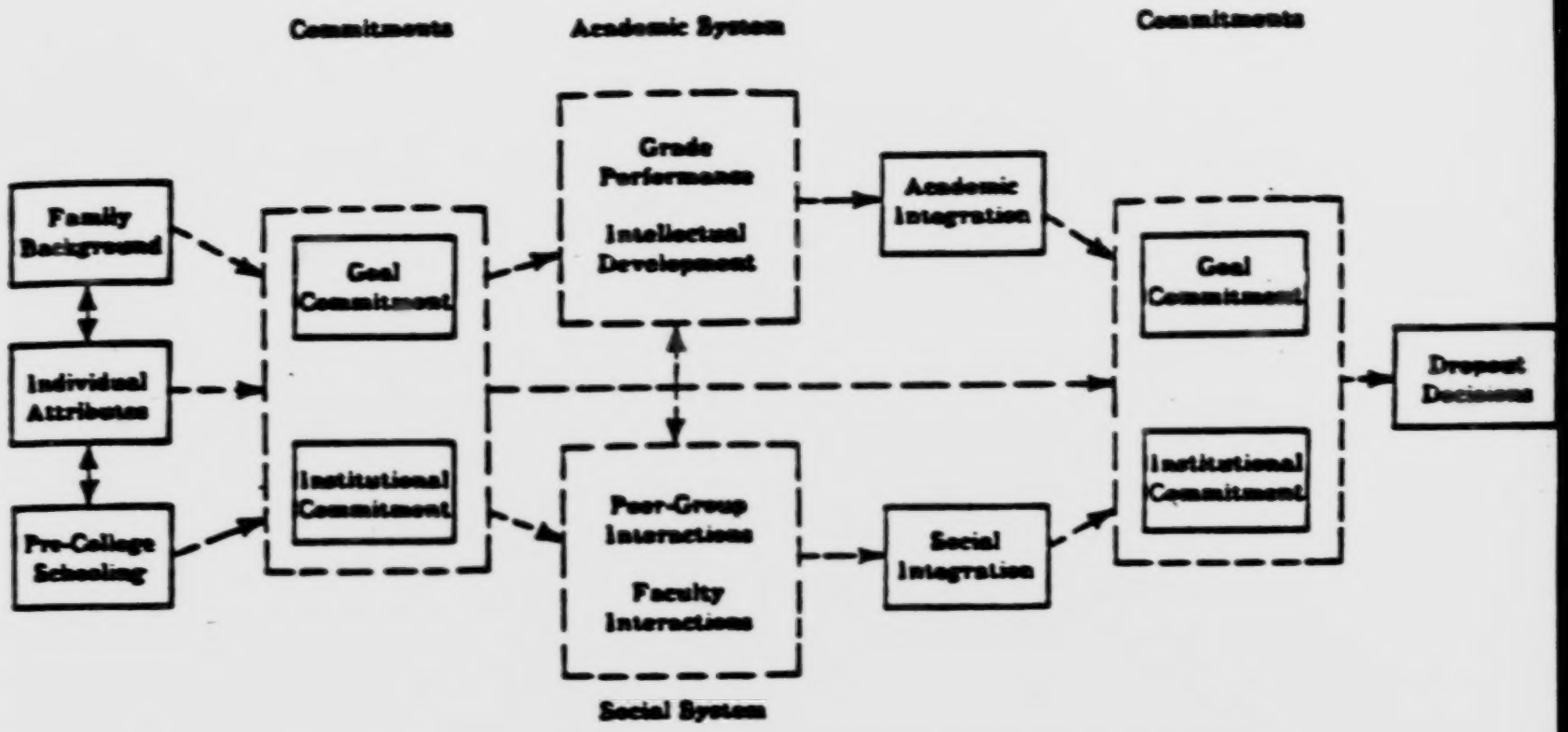


**Figure 1: Tinto's (1975) Theoretical Model of College Withdrawal.**

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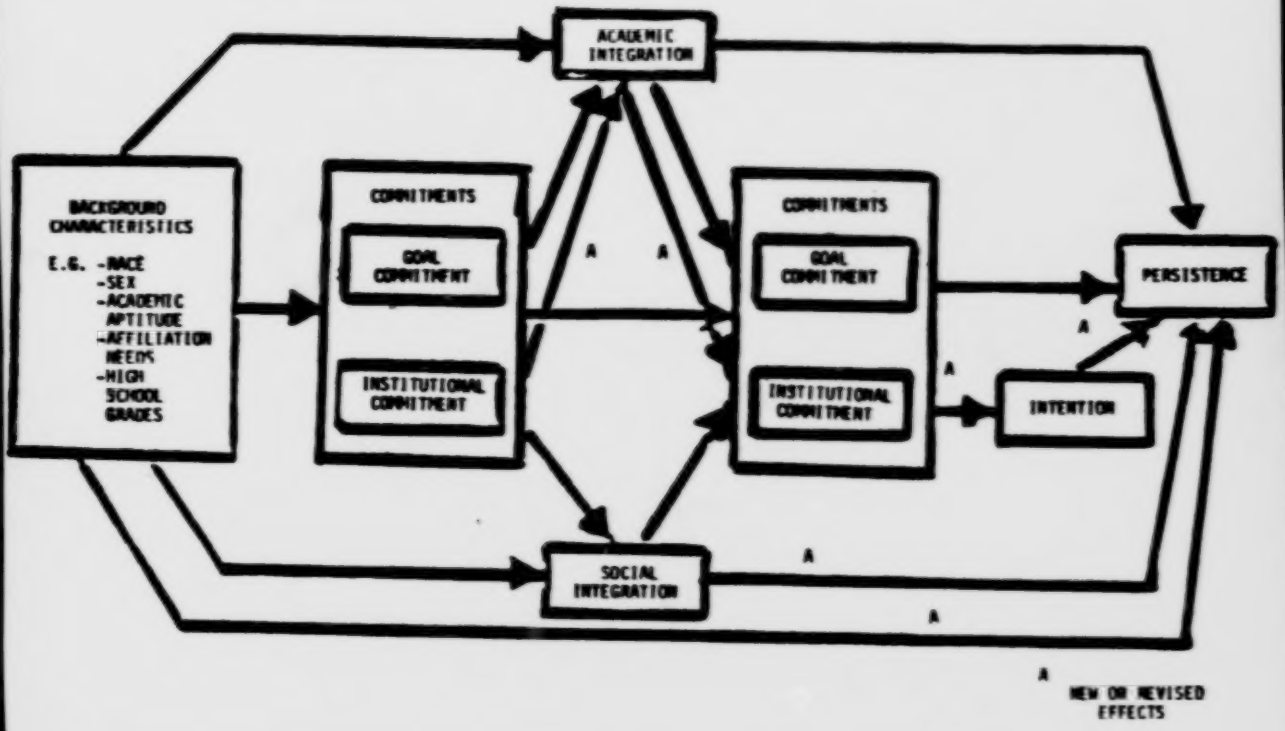
Figure 2 . SUGGESTED RECONCEPTUALIZATION OF TINTO'S MODEL




(From "A test and reconceptualization of a theoretical model of college withdrawal in a commuter institution setting" by E. Pascarella, P. Duby & B. Iverson, 1983, Sociology of Education, 56 (April), p. 98. Copyright 1983 by Sociology of Education. Reprinted by permission.)

TABLE 1. Means, Standard Deviations, and Intercorrelations Among Variables[a]

| Variables | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Secondary School Grades | 4.11 | 1.55 | | | | | | | | | | | | | | | |
| 2. Secondary School Social Activities | 2.38 | 1.55 | 06 | | | | | | | | | | | | | | |
| 3. Sex | 1.56 | .50 | 25 | -03 | | | | | | | | | | | | | |
| 4. Ethnicity | 1.94 | .23 | 12 | 02 | -07 | | | | | | | | | | | | |
| 5. Academic Aptitude (SAT) | 862.70 | 125.48 | 27 | 08 | -16 | 41 | | | | | | | | | | | |
| 6. Expected Major | 1.42 | .49 | -01 | 01 | 12 | -04 | -05 | | | | | | | | | | |
| 7. SES | 29.40 | 2.49 | -05 | 02 | -15 | 06 | 09 | -01 | | | | | | | | | |
| 8. Goal Commitment I | 20.00 | 1.42 | 14 | 02 | 07 | 08 | 15 | 07 | 04 | | | | | | | | |
| 9. Institutional Commitment I | 8.34 | 1.32 | 03 | 00 | 10 | -22 | -10 | 11 | -06 | -06 | | | | | | | |
| 10. Social Integration | 8.69 | 1.59 | -07 | 12 | 03 | -02 | -02 | 01 | -01 | 14 | -05 | | | | | | |
| 11. Academic Integration | 30.00 | 2.07 | 22 | 00 | 04 | 19 | 20 | -06 | 07 | 21 | -05 | 22 | | | | | |
| 12. Goal Commitment II | 20.00 | 1.50 | -02 | 13 | 06 | 07 | 06 | 02 | -01 | 21 | -05 | 17 | 25 | | | | |
| 13. Institutional Commitment II | 7.10 | 1.86 | -01 | -02 | 12 | 09 | -05 | 08 | 01 | 01 | 09 | 21 | 24 | 04 | | | |
| 14. Intention | 2.83 | .52 | -03 | 01 | 04 | -01 | -04 | 12 | 03 | 01 | 05 | 09 | 00 | -03 | 36 | | |
| 15. Persistence | 1.80 | .40 | 03 | 04 | -05 | 06 | 10 | 13 | 05 | 02 | 04 | 00 | 17 | 06 | 20 | 49 | |

[a]Decimals omitted from correlations.

TABLE 2. Hierchical Regression Increases Due to Different Variable Sets

| Step | Variable Set Added | $R^2$ | df | F | $R^2$ Increase | df | F | Percent Correctly Classified |
|---|---|---|---|---|---|---|---|---|
| 1 | Background Characteristics (Family background, individual attributes, & precollege schooling) | .065 | 7/347 | 1.49 | .065 | 7/347 | 1.49 | 59.1* |
| 2 | Initial Institutional & Goal Commitment I | .067 | 9/345 | 1.22 | .002 | 2/345 | .50 | 69.1* |
| 3 | Academic & Social Integration | .095 | 11/343 | 2.46** | .028 | 2/343 | 6.71** | 69.8* |
| 4 | Subsequent Institutional and Goal Commitment II | .097 | 13/341 | 2.32 | .002 | 2/341 | .58 | 70.6* |
| 5 | Intention | .305 | 14/340 | 10.42** | .208 | 1/340 | 99.77** | 88.2* |

*$p < .01$.

Note: Classification Analysis Hypothesis: Percent of overall correct classification was significantly better than chance (i.e., 50.00 percent).

TABLE 3. Standardized Regression (BETA) Direct Effects on Persistence

| Variable | Beta[a] Equation 1 | Equation 2 |
|---|---|---|
| Secondary School Grades | -.002 | .003 |
| Secondary School Social Activities | .04 | .033 |
| Sex | -.08 | -.072 |
| Ethnicity | -.01 | .005 |
| Academic Aptitude (SAT) | .08 | .079 |
| Expected Major | .14** | .096* |
| SES | .02 | .004 |
| Goal Commitment I | -.03 | -.036 |
| Institutional Commitment I | .03 | .030 |
| Social Integration | -.08 | -.092 |
| Academic Integration | .14* | .180** |
| Goal Commitment II | .03 | .053 |
| Institutional Commitment II | .18** | -.003 |
| Intention | ---- | .496** |
| $R^2$ | .097** | .305** |

*$p < .05$

**$p < .01$

[a]Equation 1 does not include Intention while Equation 2 does.

TABLE 4. Standardized and Unstandardized Regression Direct Effects for all Structural Equations[a]

| Variables | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|
| 1. Secondary School Grades | .086<br>(.078) | .039<br>(.033) | -.105<br>(-.108) | .155**<br>(.207) | -.119*<br>(-.115) | -.061<br>(-.073) | -.009<br>(-.003) | .003<br>(.001) |
| 2. Secondary School Social Activities | .009<br>(.008) | .006<br>(.005) | .130*<br>(.134) | -.019<br>(-.025) | .129*<br>(.125) | -.026<br>(-.031) | .018<br>(.006) | .033<br>(.008) |
| 3. Sex | .072<br>(.205) | .056<br>(.147) | .048<br>(.153) | .026<br>(.107) | .068<br>(.205) | .106<br>(.398) | -.006<br>(-.006) | -.072<br>(-.058) |
| 4. Ethnicity | .021<br>(.125) | -.214**<br>(-1.21) | -.027<br>(-.187) | .124*<br>(1.10) | .022<br>(.142) | .130*<br>(1.04) | -.026<br>(-.057) | .005<br>(.008) |
| 5. Academic Aptitude (SAT) | .130*<br>(.002) | -.006<br>(-.0001) | -.007<br>(-.0001) | .080<br>(.001) | .016<br>(.000) | -.086<br>(-.001) | .007<br>(.000) | .079<br>(.0002) |
| 6. Expected Major | .068<br>(.193) | .090<br>(.242) | -.005<br>(-.016) | -.060<br>(-.251) | .020<br>(.061) | .070<br>(.263) | .086<br>(.090) | .096*<br>(.077) |
| 7. SES | .046<br>(.026) | -.038<br>(-.020) | -.022<br>(-.014) | .056<br>(.047) | -.033<br>(-.020) | .022<br>(.016) | .033<br>(.007) | .004<br>(.0006) |
| 8. Goal Commitment I | | | .149**<br>(.167) | .169**<br>(.247) | .159**<br>(.168) | -.051<br>(-.067) | .021<br>(.008) | -.036<br>(-.010) |
| 9. Institutional Commitment I | | | -.047<br>(-.056) | -.006<br>(-.009) | -.026<br>(-.029) | .112*<br>(.159) | -.003<br>(-.001) | .030<br>(.009) |
| 10. Social Integration | | | | | .072<br>(.068) | .174**<br>(.203) | .033<br>(.011) | -.092<br>(-.023) |
| 11. Academic Integration | | | | | .212**<br>(.154) | .221**<br>(.200) | -.082<br>(-.021) | .180**<br>(.035) |
| 12. Goal Commitment II | | | | | | | -.037<br>(-.013) | .053<br>(.014) |
| 13. Institutional Commitment II | | | | | | | .374**<br>(.103) | -.003<br>(-.0006) |
| 14. Intention | | | | | | | | .496**<br>(.383) |
| 15. Persistence $R^2$ | .045* | .065** | .049* | .118** | .126** | .135** | .152** | .305** |

[a]Top number is the standardized Regression (BETA) Coefficient, bottom number is the unstandardized metric Regression (b) coefficient.

* $p < .05$

** $p < .01$

Figure 3. . Reduced Path Model With Intention

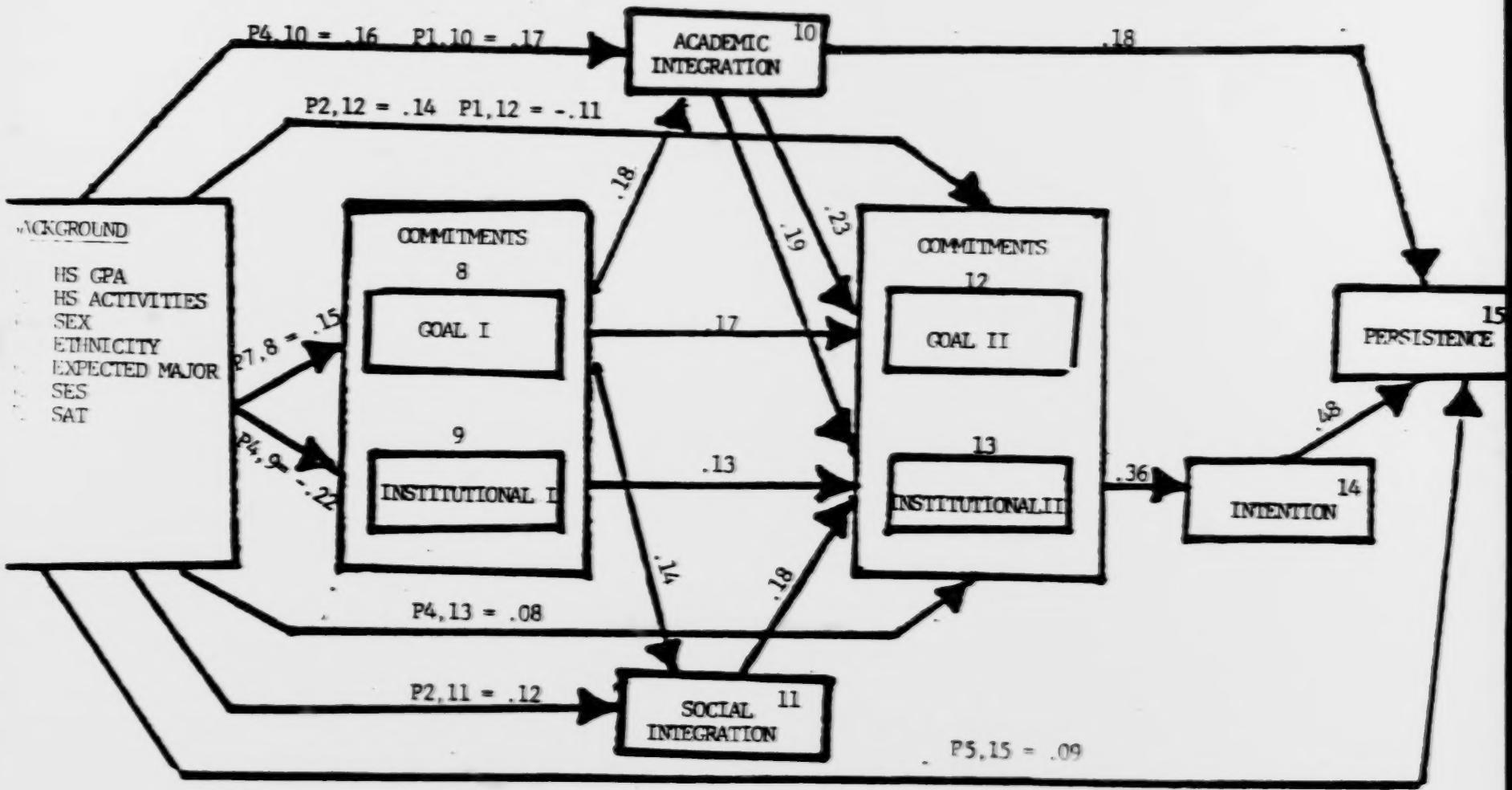


Figure 4. Reduced Path Model Without Intention

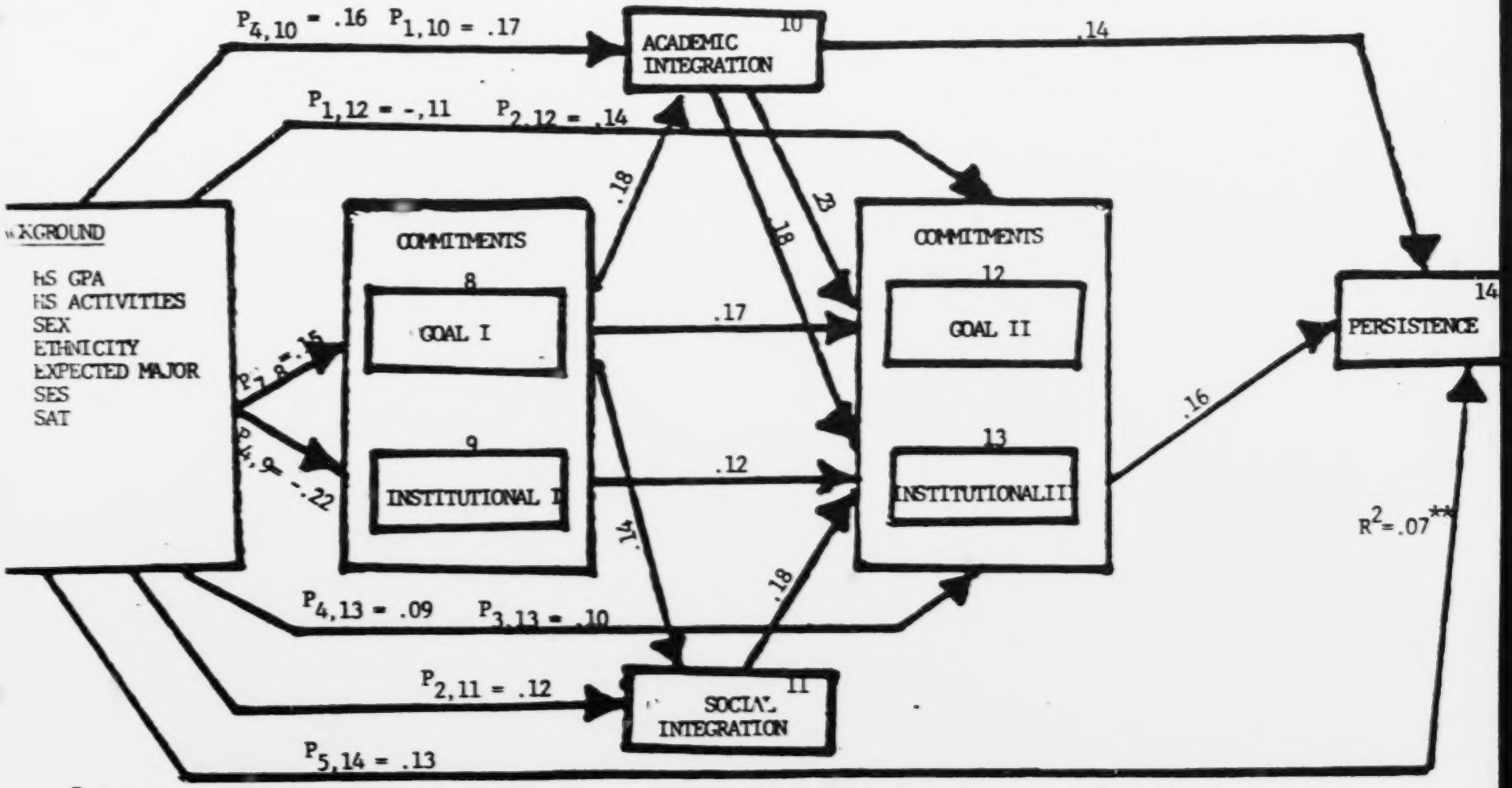


TABLE 5. Metric Indirect Effects (MIE) on Freshmen Persistence

| Variable | Metric[a] Equation 1 MIE | Equation 1 t | Equation 2 MIE | Equation 2 t |
|---|---|---|---|---|
| 1. Secondary School Grades | .005 (.006) | 0.93 | .004 (.009) | .451 |
| 2. Secondary School Social Activities | -.002 (.005) | -0.51 | .000 (.008) | .006 |
| 3. Sex | .023 (.014) | 1.53 | .019 (.026) | .748 |
| 4. Ethnicity | .065 (.037) | -1.75 | .043 (.059) | .739 |
| 5. Academic Aptitude (SAT) | .000 (.0001) | -0.05 | .000 (.0001) | .069 |
| 6. Expected Major | .005 (.013) | 0.41 | .040 (.0242) | 1.63 |
| 7. SES | .002 (.002) | 0.81 | .005 (.005) | .958 |
| 8. Goal Commitment I | .006 (.006) | 1.07 | .009 (.009) | 1.00 |
| 9. Institutional Commitment I | .006 (.005) | 1.30 | .006 (.009) | .633 |
| 10. Social Integration | .009 (.004) | 2.33* | .013 (.008) | 1.69 |
| 11. Academic Integration | .009 (.004) | 2.33* | .001 (.006) | .208 |
| 12. Goal Commitment II | | | -.005 (.007) | -.688 |
| 13. Institutional Commitment II | | | .040 (.007) | 5.65 ** |

[a] Standard errors of indirect effects are in parentheses. Equation 1 omits intention while Equation 2 includes it.

** $p < .01$